REMARKS

Claims 12-21 are pending and under consideration. Reconsideration is requested based on the following remarks.

Response to Arguments:

The Applicants appreciate the consideration given to their arguments, and the new grounds of rejection. Further favorable consideration is requested.

Claim Rejections - 35 U.S.C. § 103:

Claim 12-21 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 3,271,600 to Philofsky et al. (hereinafter "Philofsky") in view of U.S. Patent No. 6,087,744 to Glauning et al. (hereinafter "Glauning"), U.S. Patent No. 2,999,945 to Heller et al. (hereinafter "Heller"), and U.S. Patent No. 3,906,261 to Ogura et al. (hereinafter "Ogura"). The rejection is traversed. Reconsideration is earnestly solicited.

Glauning apparently discloses the possibility of conducting circulation of a cooling medium based on a thermosiphon principle such that no separate pump is needed (column 3, line 42-44). According to the disclosure of Philofsky, however, an external pump or compressor is utilized to circulate a coolant that is a liquid *or* a gas, as described at column 4, lines 8-12. The coolant in Philofsky, in particular, is either a liquid, in which case it is circulated by a pump, or else it is a gas, which is circulated by a compressor. The coolant in Philofsky, therefore, is not a two-phase medium, nor does it comprise a liquid and a gas as phases.

It is further submitted that it would have been known to a person skilled in the art that the cooling system of Philofsky could not be operated using a two-phase coolant. To the contrary, a cooling system which requires forced circulation of the coolant by a pump or compressor, as in Philofsky, necessarily needs a coolant that is present in a single phase, i.e. either liquid or gaseous. This is due to the fact that a pump, in general, is only capable of performing transport of a liquid, while a compressor is only capable of transporting a gas. Thus, reliable forced cooling system, using a pump or a compressor, could not be provided if the coolant is available in two phases.

A person skilled in the art would also know, on the other hand, that in the case of a cooling circuit based on a thermosiphon principle, a two-phase cooling medium is needed. The thermosiphon principle, furthermore, requires that the cooling medium be vaporized at a geodetic lower level than the area in which the cooling medium is condensed. Consequently, it

would have been obvious to a person of ordinary skill in the art that a technical barrier exists to applying the technical teaching of Glauning to the disclosure of Philofsky.

The Office Action seeks to compensate for this deficiency with respect to Philofsky by combining it with Ogura, saying in the last paragraph at page 4, that:

> Finally, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to use a vaporizable coolant. One of ordinary skill in the art would have been motivated to do this to enhance the cooling effect. Ogura et al., US 3906261 disclose use of a two-phase coolant, for the inherent purpose of using the latent heat of vaporization to cool the stator core. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to use a two-phase coolant in the device of the combination of Philofsky, US 3271600. One of ordinary skill in the art would have been motivated to do this the take advantage of the large heat capacity of the latent heat of vaporization of the cooling fluid to more effective cool the stator.

In the claimed invention, however, a two-phase coolant is not used to enhance the cooling effect due to a large heat capacity of the cooling medium. Nor could a two-phase coolant be incorporated in the dynamoelectric machine of Philofsky, as discussed above, let alone enhancing the cooling effect by doing so.

In the claimed invention, rather, a two-phase coolant is used because the cooling system is driven by a thermosiphon effect. No such imperative exists in Philofsky. The thermosiphon effect itself is driven by differences in the physical density of the liquid and the gaseous phases of the cooling medium. The twelfth clause of claim 21, in particular, recites:

> A coolant is circulated by a thermosiphon effect with boiling and vaporization, the coolant being heated or at least partially vaporized in the discrete coolant areas.

Furthermore, it is necessary for a cooling system that is based on a thermosiphon effect to have heat generating parts, which evaporate the cooling medium, positioned at different geodetic heights than the cold surfaces, where the cooling medium is condensed. Consequently, a cooling system that applies a thermosiphon effect necessarily needs a two-phase coolant in a cold surface located at a geodetic higher level than the heat generating parts.

A thermosiphon effect with boiling and vaporization, moreover, isn't the only deficiency of Philofsky, US 3271600 and Glauning with respect to claim 21. Philofsky, rather, also lacks a refrigeration unit. Philofsky, in particular, relies on external pump or compressor 55 to circulate coolant through cooler 56, as described at column 4, lines 8-12. To circulate coolant by a thermosiphon effect, on the other hand, requires a thermal gradient, something cooler 56, a parallel flow heat exchanger, cannot provide, at least after you dispense with the pump.

The dynamoelectric machine of Philofsky is intended to cool a stator, as described at column 1, lines 54-64. Philofsky will overheat if it is run without a pump. The dynamoelectric machine of Philofsky is not meant to overheat, since then it could not cool a stator. Thus, modifying Philofsky as proposed in the Office Action will render the reference unsuitable for its intended purpose of cooling a stator, as well as inoperable, in contravention of M.P.E.P. § 2143.01. As provided therein:

> If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

Since the dynamoelectric machine of Philosfsky could not cool a stator if it overheated, and the dynamoelectric machine of Philosfsky would only run without pump 55 until it overheated, modifying Philosfsky as proposed in the Office Action would render Philosfsky unsatisfactory for its intended purpose of cooling a stator. There is thus no suggestion or motivation to make the proposed modification, *In re Gordon*.

The fifth clause of claim 21 recites:

> A refrigeration unit comprising at least one cold head having at least one cold surface.

Neither Philofsky, Glauning, Heller, nor Ogura teach, disclose, or suggest, "a refrigeration unit comprising at least one cold head having at least one cold surface," as recited in claim 21. Philofsky, rather, relies on blower 33 to circulate gas within the housing and ducts, as described at column 3, lines 39, 40, and 41, and as shown in Fig. 1. Cooler 56 is a cooler, as described at column 4, lines 8-14, not a cold head, contrary to the implication in the Office Action. Cooler 56 may be seen clearly in Fig. 1, in fact, to be a parallel flow heat exchanger, not "at least one cold head having at least one cold surface," as recited in claim 21, at all.

Glauning, for its part, circulates fluid through a radiator, not "a refrigeration unit comprising at least one cold head having at least one cold surface," as recited in claim 21. In particular, as described in Glauning at column 2, line 67, continuing at column 3, lines 1-5:

> The Figure schematically shows an internal combustion engine 100, a radiator 101, and two conduits 102, 103 for feeding fluid from the engine 10 in the radiator 101 and back again. Cooling fluid for the electrical machine 1 is tapped form the conduit 103 by a tube 104 and fed back to a pump 106 by a tube 105.

Although the Heller apparently describes a refrigeration machine to enhance cooling of an electrical generator, the disclosure is very general. Such a refrigeration machine could be an

apparatus for cooling a power plant or an apparatus usable in a household. Heller, in particular, mentions no cold head associated with a refrigeration machine at all.

Nor is a cold head inherent in Heller, contrary to the assertion in the Office Action at page 4, in the first full paragraph, since alternatives to a cold head exist. Heller, rather, dates from 1961, a time when cold heads were not yet usual in cooling technology, especially in cooling technology for electrical generators. Heller, consequently, used a steam jet ejector-actuated cooling installation, as described at column 2, lines 1 and 2, not a cold head.

Moreover, as provided in M.P.E.P. § 2112(IV):

> The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993).

Thus, even if it were true that a cold head *may* occur or be present in Heller, that would still not be sufficient to establish the *inherency* of a cold head in Heller, *In re Rijckaert*.

As provided further in M.P.E.P. § 2112(IV):

> To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.' *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999).

Thus, to establish inherency, Heller must make clear that a cold head is *necessarily* present, and that it would be so recognized by persons of ordinary skill. Since, as discussed above, alternatives to a cold head exist, such as the steam jet ejector-actuated cooling installation described in Heller, a cold head is in no way necessarily present in Heller, *In re Robertson*.

Finally, as provided in M.P.E.P. § 2112(IV):

> In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art. *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990).

Thus, to rely on the theory of inherency, the Office Action must show that a cold head necessarily flows from Heller. Since, as discussed above, alternatives to a cold head, such as the steam jet ejector-actuated cooling installation described in Heller, exist, a cold head does not necessarily flow from Heller, and so a cold head is not inherent in Heller, *Ex parte Levy*.

Ogura, finally, utilizes ebullition of the cooling medium, as described at column 1, lines 5-

9, and thus has no use for "a refrigeration unit comprising at least one cold head having at least one cold surface," as recited in claim 21. Thus, even if Philofsky, Glauning, Heller, and Ogura were combined, as proposed in the Office Action, the claimed invention would not result.

The eighth clause of claim 21 recites:

> Said line system thermally coupling said cold head to the heat generating parts of said stator to be cooled with the stator winding, having discrete coolant areas associated with the heat generating parts of said stator to be cooled.

Neither Philofsky, Glauning, Heller, nor Ogura teach, disclose, or suggest a "line system thermally coupling said cold head to the heat generating parts of said stator to be cooled with the stator winding, having discrete coolant areas associated with the heat generating parts of said stator to be cooled," as recited in claim 21, either. Thus, even if Philofsky, Glauning, and Ogura were combined, as proposed in the Office Action, the claimed invention would not result.

Philofsky, rather, teaches away from discrete cooling areas at column 1, lines 43-47, where he describes connecting an individual, i.e. discrete vent tube to each coil as "prohibitive in view of the large number of coils and tubes in each machine, which would require over 1500 connections for a typical machine."

Similarly, in Glauning, a cooling jacket 40, rather than "discrete coolant areas associated with the parts of said stator to be cooled," as recited in claim 21, surrounds the stator 34, as described at column 3, lines 12 and 13.

Heller, for its part, describes a steam jet ejector-actuated cooling installation, as discussed above, not a "line system thermally coupling said cold head to the heat generating parts of said stator to be cooled with the stator winding, having discrete coolant areas associated with the heat generating parts of said stator to be cooled," as recited in claim 21.

Ogura, finally, immerses the stator winding in vaporizable liquid, as described in the Abstract. Thus, even if Philofsky, Glauning, and Ogura were combined, as proposed in the Office Action, the claimed invention would not result. Claim 21 is submitted to be allowable. Withdrawal of the rejection of claim 21 is earnestly solicited.

Claims 12-20 depend from claim 21 and add additional distinguishing elements. Claims 12-20 are thus also submitted to be allowable. Withdrawal of the rejection of claims 12-20 is earnestly solicited.

Conclusion:

Accordingly, in view of the reasons given above, it is submitted that all of claims 11-21

are allowable over the cited references. There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

If there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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